that of Horsley, v. Bergmann and others, certain portions of the brain and spinal cord may be said to have been brought completely with the domain of operative surgery. The subject of cerebral localization must however be still further extended before complete freedom of operation is attained, and meanwhile the surgeon looks to the physiologist for still more additions to our knowledge in this direction.

JAMES E. PILCHER.

BERGMANN ON THE SURGICAL TREATMENT OF DISEASES OF THE BRAIN.[1]

This paper is interesting not only from a surgical, but from a purely medical standpoint. It is an attempt to test a question which is fast becoming of vital moment, whether the general medical practitioner in calling upon the surgeon to operate in a given case must not be ready to exhibit as great an acquaintance with two tenets of modern surgery as his operating colleague. The time is past when the surgeon operates because the procedure is favored by a colleague who looks upon the knife as a mere mechanical agent devoid of all responsibility for danger or meddlesome interference because it is guarded by the paraphernalia of antisepsis. The careful exclusion of a certain class of cases from the domain of the surgery of the brain and a perfection of the methods applicable in fit cases is the true advance of surgery in this field. If in recent times the necessity of trephining in deep seated abscess has became urgent, it is because of two propositions: (1) The encapsulation of these processes and (2) the difficulty of their recognition. It is only in the acute abscess occurring on the surface of the brain, that we find no so-called limiting zone. These abscesses are traumatic in origin. The chronic brain abscess even if bounded by a so-called capsule is still liable to enlarge. The only result of non-interference in these abscesses is rupture into the ventricle and death. True, isolated cases are found where an abscess has discharged externally (Mac Leod), but these are so uncommon that they must be dis-

[1]Die Chirurgische Behandlung von Hirnkrankheiten von Prof. E. VON BERGMANN Arbeiter aus der Klinik, Berlin, 1887.

regarded. The diagnosis of brain abscess is inseparably linked with the etiology. A brain abscess is never idiopathic: it is always connected with a trauma which existed as an open wound in the soft or hard parts of the head, or it is traced to some other suppurating process in the skull—frequently from a suppurating ear. There are also metastatic and tubercular brain abscesses. The metastatic abscess, generally multiple, appears in the course of pyæmic processes and concomitant with abscesses in other organs of the body. They very rarely appear singly in the brain. Virchow first described the appearance of brain abscesses in subjects suffering from affections of the lungs. Näther and Senator have since then recorded interesting cases belonging to this class. Gangrene of the lung, empyema, bronchiectasis furnish their contingent. There is little in these cases to encourage operative interference. The diagnosis must in cases of this kind lie between abscess and tumor. The operative therapy, however, is still out of question. The tuberculous abscess has reached in isolated cases the size of traumatic abscesses (Fraenkel, Wernicke.) A conglomerate tubercular mass may liquefy at its center, and on an examination of the fluid (Fraenkel) an immense number of micro-organisms may be found. The wall of such abscesses may be studded with tubercle. There is in these cases very little to encourage operative interference. We can only hope for a result from operative measures in cases of traumatic abscesses and those resulting from suppurative ear processes and suppuration in the bones of the skull. The diagnosis in these cases must be early and positive. It may be noted that in all traumatic abscesses there must have preceded an open wound communicating externally. In abscesses resulting from suppuration of the ear we find as a rule a long standing otitis media, sometimes dating from childhood (Exanthemata.) In the majority of these cases the abscess is located in the temporal or occipital lobe. In statistics by Barr, 55 of 76 cases of abscess were situated in the temporal lobe,but the facts relating to encapsulation or the contrary are not mentioned. It is interesting that the pus was of a fetid character in 69 of these cases. It must not be overlooked that these cases of suppurating otitis may give rise also to meningitis and thrombosis of the cerebral sinuses. Compared to the

role of abscess from ear troubles that resulting from other suppurating processes in the cranial bones is insignificant. In studying the symptomatology of abscess of the brain those traced to the ear are always insidious in their invasion. Looking at the symptomatology of brain abscess in its entirety we find it divided into three distinct groups, those manifestations due to the suppuration, those which may be traced to pressure and finally those pointing to their localization. If after the healing of a fracture there is a slight evening rise of temperature with periods of complete absence of the same we may begin to suspect suppuration, especially if this fever,however,can be accompanied by symptoms of pressure. In otitis media occasional fever has little significance; it may be traced to the ear trouble. The pressure symptom found by the author in most of his cases was headache, aggravated by the fever or any of the conditions (alcoholic indulgence) which increase intra-cranial pressure. The pain corresponds in cases to the exact location of the abscess, and is brought into prominence by slight percussion. Somnolence and even coma or Cheyne-Stokes respiration are recorded in isolated cases (von Bergmann), while optic neuritis, constant in cases of tumor, is rather an unfrequent symptom of abscess. In studying the localization of brain abscess we will obtain positive data if the process is situated in the motor tract. It may exist in the temporal and frontal lobes and yet give little evidence of its presence. Moreover the symptoms will vary with the extent of cortical (ganglionic) substance compromised. Large areas, the greater portion of a lobe or hemisphere, may be occupied by an abscess without serious disturbance. The grey matter being intact, the fibres of conduction are simply pressed aside, and symptoms of localization are absent, if conductivity remain intact. Temporary suspension of conductivity may result if the surrounding brain tissue become œdematous. This latter condition is due to pressure and is immediately relieved upon the evacuation of the pus. The pareses resulting from the above conditions invariably disappear. As stated, the mass proper of the frontal lobe may be destroyed in the absence of distinct symptoms of localization; yet if the cortex be involved, we at once have manifestations of disturbance of speech, the functions of the eye, facial paresis,

etc. In a case of Wernicke hemianopsia pointed clearly to the lesion, whereas in Janeway's case symptoms of localization were absent in an abscess situated in the temporal and occipital lobes. If in the course of an otitis we have supervening deafness in the sound ear there is a valuable point obtained for localization. Abscesses of the cerebellum more than any others have escaped observation or diagnosis. Here vertigo, cephalalgia, indifference, somnolence may aid diagnosis. The object in modern surgery is not so much to discover and localize the abscess *per se* as to eliminate the operative from the non-operative cases. As minor details the author deprecates the irrigation of brain abscess. The trocar is preferred to the knife as an exploring agent. The diagnosis in these cases leaves more to be desired than the technique.

The scope of surgery is more narrow in the domain of cerebral tumor than in that of abscess. The surgeon must not only be cognizant of the existence of the tumor but also whether it can be entirely removed with safety. Tumors originating from the cranial bones have been safely removed, even when large areas of bone were involved, but the isolated cerebral tumors are not so amenable to treatment. They are either in the form of diffuse infiltrations, or they may be distinctly encapsuled, thus admitting of enucleation. In a statistical compilation of brain tumors (White) it was found that there is one tumor of the brain to every 59 post mortems. Of 100 brain tumors 45 were tubercle, 24 glioma, 10 sarcoma, the remainder were scattered among carcinomata, cystomyxoma, etc. As isolated tuberculosis of the brain is rare, tuberculosis, as also syphilis, does not come under the class of operative cases. Diffuse infiltrations must also be excluded. Of these 100 tumors classified post-mortem 9% might have been successfully removed. But the clinician meets another obstacle; he can only remove a growth which manifests itself by symptoms. Otherwise the growth does not exist within the possibilities of his diagnosis. The manifestations most positive are those traceable to the existence of a growth in the motor tracts. Even here, if the tumor be very large, it cannot be removed without great danger of acute cerebral œdema, even if well encapsulated. The removal of a tumor in the comatose stage of the disease

is hopeless. The field therefore for surgery in these growths is very narrow. Given the diagnosis and localization we must look upon trephining or chiseling as explorative until we find if the growth can be safely removed without subsequent cerebral œdema. Our technique here is defective and leaves, a great many difficulties to be cleared by future work.

Still more confined than the above is the scope of surgery in the field of epilepsy. Reflex epilepsy, where the aura proceeds from an injured peripheral nerve of the scalp, is the rarest of occurrences. Surgery must therefore confine itself to those cases of cortical epilepsy where the irritation proceeds from a cicatrix resulting from an injury to the brain cortex. We operate only in the hope of removing a palpable cicatrix of the brain convolution. Surgery today cannot interfere in cases of neuroses. Von Bergmann reiterates that surgery only holds out a hope of success in those cases where the epilepsy begins in a manner exactly similiar to that met with in experiments upon animals. The convulsion is initiated by the contractions of special groups of muscles. These contractions spread to those muscles of the opposite side of the body, and finally became general. Finally we have the typical pareses and paralyses in the muscles convulsed. Confining ourselves to the cases where special muscular groups are first affected (Jacksonian epilepsy) surgery will attempt to remove that part of the brain cortex (nervous centre) the irritation of which is manifested in the contractions of the muscles first affected.

The author would advise operation in those fixed forms of traumatic epilepsy having the exact Jacksonian type. In conclusion the tone of von Bergmann's paper deprecates that tentative spirit in brain surgery which operates with the vague idea of holding out some hope to the unfortunate sufferer by interference not built upon exact diagnosis by physiological experiment.

HENRY KOPLIK.

THE ETIOLOGY OF FRACTURES OF THE SKULL.

Dr. Arthur W. Hare considers this subject in a lecture delivered to